

# Kinergetics Heater & Chiller Skid (HCS-1)



## Introduction

The Divex Heater Chiller Skid (HCS) is a packaged, self contained unit specifically designed to provide supplies of heating and cooling fluids to be used for the environmental conditioning of Deck Decompression Chambers (DDC). This is achieved via the controlled distribution of these supplied fluids by a Chamber Environment Controller (CEC) unit to a Habitat Conditioning Unit (HCU) within the DDC. Once commissioned the above arrangement provides controlled delivery of heating, cooling and dehumidification capacity to a DDC, in order to create and maintain optimum living conditions for saturation diving personnel.

The HCS-1 assembly contains a refrigeration system, electrical heater with 2 immersion heaters and two fluid pumps to circulate hot and cold fluid for heating and/or cooling of the chamber. The fluid temperature is controlled to within 1°C of the set temperature by electronic controllers. The heater tank, refrigerator system, fluid pumps, interconnecting pipe work and electrical distribution box are built into a robust stainless steel frame. Inputs to the system are 440-480V, 3-phase, 60 Hz electricity and cooling seawater. The output is heated or chilled water/glycol mixture at pressures up to 5 bar and 30 litres/min.

The HCS-1 with external controls is designed to supply a ring main system, from which the fluid is taken to perform heating or cooling within the chamber. The flow of the heating or chilling fluid is done using a Chamber Environmental Controller (CEC) which should be mounted next to the chamber.

## Theory of Operation - Fluid Circuits

The HCS-1 uses as 70/30 water-glycol mixture as fluid for heat transfer. This mixture is used to prevent freezing of the fluid if exposed to cold ambient temperatures and also to prevent freezing inside the chiller refrigeration circuit. There are two separate circuits in the HCS-1 that produce fluids at controlled temperatures that will perform heating, cooling and dehumidification.

The fluid temperatures are controlled by two electronic controllers which control the temperature of the fluids by either switching on the heater elements or by opening a solenoid valve in the refrigeration circuit. The fluid circuits are run at a maximum pressure of 6 bar and the pumps used are multistage vertical axis pumps, driven directly by electric motor. Pressure gauges are mounted on the front of the HCS to monitor the out going fluid pressures. A pressure relief valve is provided in each circuit to prevent damage to the pumps and relieve any chamber gas that might find its way into the cooling/heating circuits.



## Specification

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Dry Weight	Approx. 400 kg (880 pounds)
Size (mm)	1626 x 914 x 864
Electrical Input	440 VAC, 3 Phase, 60 Hz, 40 Amp
Heating Capacity	9 kW
Cooling Capacity	9 kW
Temperature Control	Adjustable set point, $\pm 1^{\circ}\text{C}$ hot/cold fluid
Circulation Pumps	35 litre/min at 4 bar
Cooling Water Input (sea water condenser)	47 ltr/min @ $32^{\circ}\text{C}$ , 8 bar max
Skid Fluid Connections	1" NPT (F)



## Order Codes

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Kinergetics Heater & Chiller Skid (HCS-1) 440VAC  
KI17058AB

Kinergetics Heater & Chiller Skid (HCS-1) 380VAC  
KI17058AC